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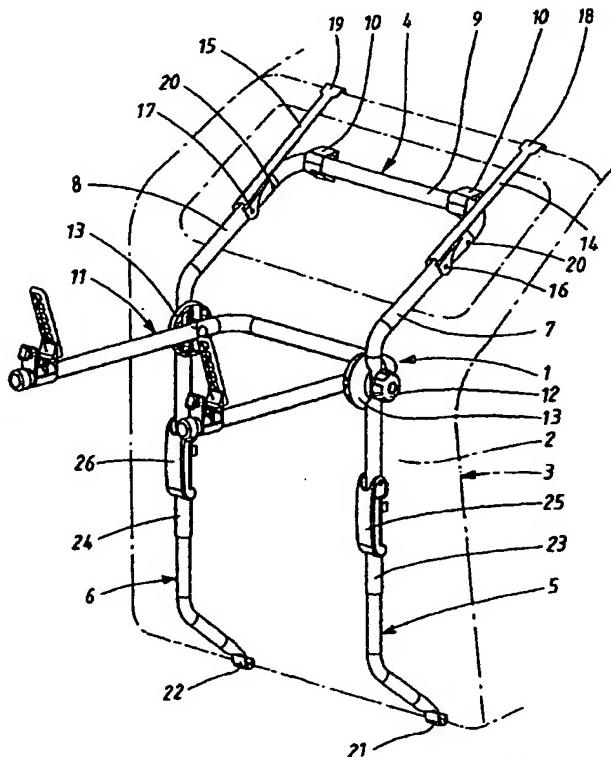
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(54) Title: VEHICLE-MOUNTED LOAD CARRIER



(57) Abstract: The present invention is concerned with a vehicle-mounted load carrier (1) of the type which is fastened across a door, hatch (2) or the like, preferably at the rear of the vehicle (3). The load carrier comprises a load-bearing frame (4-6) and at least two gripping means (18, 19, 21, 22) disposed on the frame and intended to grip two substantially mutually opposite edges, preferably the top and the bottom edge of the door, and means (25, 26) for tensioning the gripping means across the door by the positive relative displacement thereof towards each other. The novel characteristics of the invention are that the frame is divided into a main section (4), bearing the gripping means (18, 19) for one edge, and at least one tensioning section (5, 6) disposed moveably in relation to the main section and bearing the gripping means (21, 22) for the other edge, and that the main section and the tensioning section are connected to each other in a linearly displaceable fashion, tensioning being achieved by the mutual displacement of the frame sections.

WO 00/76809 A1

Vehicle-mounted load carrier**FIELD OF TECHNOLOGY**

The present invention is concerned with a vehicle-mounted load carrier of the type which is fastened across a door, hatch or the like, preferably at the rear of the vehicle, which load carrier comprises a load-bearing frame and at least two gripping means disposed upon said frame, which gripping means are designed to grip two substantially mutually opposite edges, preferably the top and bottom edge of the door, plus means for tensioning said gripping means across the door by the positive displacement thereof towards each other.

STATE OF THE ART

A load carrier of the above-mentioned type for vehicles is disclosed in international patent application WO 97/30870. The device according to this application has a load-bearing frame 10, two gripping means 3 at the upper end and two gripping means 2 at the lower end. When mounted, the entire load carrier is hooked to a rear hatch, at which time the width of the opening between the hooks must be somewhat greater than the height of the hatch, and after the load carrier has been hooked to the hatch the hooks must be adjusted so that the load carrier is fastened to the hatch. Fig. 2 shows a tensioning means wherein a bracket 4 is caused by means of an adjusting device 33 to fasten the load carrier by means of clip(s) 5, said load carrier being suspended from the hatch 8 by its upper gripping means 3.

A load carrier of the type shown in WO 97/30870 suffers from a number of drawbacks. The adjusting mechanisms themselves requires numerous turns of the handles, which are located behind the frame, before the load carrier is securely fastened, which is inconvenient, and with the effects of time it is highly likely that the threads will become stiff, making adjustment positively difficult for a person whose wrists are weak. Moreover, the available adjustment distance is short, with the result that if a user should wish to use the load carrier on another vehicle with different a different hatch size, this type of load carrier requires extensive reconstruction including removal of screws and remounting in new holes, if it is even possible.

35 DESCRIPTION OF INVENTION

The present invention makes available a load carrier which is easy and quick to fasten, which is adjustable within wide limits, and whose operating parts are less

liable to be affected by corrosion and the like. For this purpose the load carrier is endowed with the following features: the frame is divided into a main section, which bears the gripping means for one edge, and at least one tensioning section, which is moveable with respect to the main section and which bears the gripping means for the other edge; said main section and tensioning section being connected to each other in a linearly displaceable fashion such that tensioning can be achieved by bringing about the mutual linear displacement of the frame sections by means of the tensioning means.

In a preferred, stable embodiment of the invention the frame includes at least one but preferably—for the sake of better stability and less cumbersome gripping means—two tensioning sections, which each bear a gripping means for one of the edges and which are each connected to the main part by a pair of preferably telescopic tubes disposed one on each side of the load-bearing frame. Telescopic tubes are a simple and reliable design for linear motion, which in the present case may be integrated into the construction by choosing suitable dimensions for the constituent parts.

Furthermore, quick fastening can be achieved if each tensioning means includes an operating means mounted rotatably about a shaft and having a surface which is eccentric with respect to the shaft, and a fulcrum having a bearing surface that interacts with the eccentric surface of the operating means, said shaft and hence said operating means being mounted to one of the frame sections and said fulcrum being mounted on the other frame section so that the operating means and hence the load carrier can be caused to assume an unfastened and a fastened position corresponding respectively to a more and a less centred position of the fulcrum in relation to the shaft and to corresponding relative displacements of the frame sections. In a variant of the invention, the shaft of the operating means is mounted to pass transversely through the outer telescopic tube via elongated holes extending along the length of the tube, permitting displacement of the shaft along the tube, and a drag link is provided inside the tube between the shaft and the inner telescopic tube, in combination wherewith the fulcrum is disposed on the outer tube and the eccentric surface disposed on the operating means in such a manner that the rotation of the operating means from the unfastened into the fastened position, by the interaction between the eccentric surface of the operating means and the fulcrum, causes the shaft, the drag link, and hence the inner tube to slide telescopically into the outer tube. This design features a protected location inside the tubes and is thus durable, relatively simple, and reliable.

To permit simple dimensional adjustment, desirable e.g. when changing vehicles, the drag link may be provided with a connector to the shaft which is selectively adjustable along the length of the drag link.

A very useful solution for an adjustable connection between the drag link and the shaft is of the type used in so-called Polygrip pliers, namely, the drag link is elongated in form, the shaft extends through a hole in the drag link, the hole in the drag link is elongated and disposed longitudinally along the drag link and is formed with a slip side, which is straight, and a locking side having a row, parallel to the slip side, of mutually adjacent notches having the shape of circular segments, and the shaft is of a cross-section having the form of the major segment of a circle with a removed part in the form of a minor segment, the diameter of the circle being substantially equal to the perpendicular distance between the slip side and the bottom of one of the circular segment shaped notches, and the smallest thickness of the shaft at the "removed" segment being substantially equal to the perpendicular distance between the slip side and the peaks separating the notches. In this embodiment the shaft is rigidly united to the operating means in such a manner that when the operating means is in its unfastened position the shaft has its least thickness perpendicular to the slip side and moveable in relation to the hole in the drag link, and when the operating means is in its fastened position part of the shaft is located in one of the circular segment shaped notches, blocking transverse movement of the drag link in relation to the shaft.

DESCRIPTION OF FIGURES

- The invention will be more particularly described and explained below with reference to an example of embodiment shown in the attached figures, where:
- Fig. 1 is a perspective drawing of a load carrier according to the invention,
 - Fig. 2 is a side elevation of the load carrier shown in Fig. 1,
 - Fig. 3 is a side elevation, partly cut away, of a tensioning device of the load carrier in the fastened position,
 - Fig. 4 is an elevation showing a section on line A-A in Fig. 3, but with certain parts not shown in section for the sake of simplicity, and
 - Fig. 5 is an elevation similar to Fig. 3 but with the tensioning device in the unfastened position.

PREFERRED EMBODIMENT

It may be seen from Fig. 1 that the load carrier of the invention comprises a load-bearing frame 1, which is shown fastened to the rear hatch 2 of a motor vehicle 3, which is indicated by dashed lines. The load-bearing frame comprises
5 an upper frame section 4 and two lower frame sections 5 and 6, which frame sections are constructed of tubing of substantially circular cross-section. The upper frame section 4 is U-shaped with its arms 7 and 8 pointing downwards. The two arms 7 and 8 and the lower frame sections 5 and 6 are each bent at respective similarly located points in such a manner that the load carrier stands
10 clear of the door and is in contact therewith only at the ends of the lower frame sections and at the "base" 9 of the U, where two rubber feet 10 pressed around said base provide support against the vehicle. The upper frame section is stabilised laterally not only by the base 9 of the U but also by a cycle carrier 11 mounted below the bends in the arms 7, 8. The cycle carrier, like the frame, is
15 U-shaped and constructed of tubing and is fixed to the arms 7, 8 near its base section by means of fixing screws with a knob 12 and a spacer 13 of known type, having recesses for the tubes for the purpose of locking the parts in relation to each other when the knobs are tightened, in the present case with the cycle carrier projecting outwards for the purpose of carrying bicycles. The cycle
20 carrier will not be further described since it is not part of the invention as such.

On the parts of each of the arms 7, 8 adjacent to the base 9 of the U, hitching means 14, 15 are provided for attachment to the top of the door, which hitching means are at least in some degree rotatably mounted on the arms 7, 8 by means of respective through pins 16, 17 and are each fitted at their upper end
25 with a hook 18, 19, which is hitched to the top of the door 2. The rotatability is an advantage when changing host vehicles, and the hooks can also be interchanged with hitching means of differing dimensions, e.g. in length, in order to fit vehicle of different types. The hitching means may also be moved to other holes 20 to change the gripping width. For hitching to the lower edge of the door
30 2, the lower frame sections 5 and 6 are each provided with a lower hook 21, 22.

The upper frame section 4 and the respective lower frame sections 5, 6 are mutually connected inasmuch as the lower frame sections 5, 6, whose tubing is of a smaller diameter than that of the upper frame section 4, are inserted telescopically a certain distance into a tube section 23, 24 of the arms 7, 8 of the
35 upper frame section. Further, adjoining the telescopic sections there are provided operating means 25, 26 which, during the mounting of the load carrier on the vehicle or its removal therefrom, permit the upper frame section 4 and the

lower frame sections 5, 6 to pull together or apart by the telescopic sliding of the lower frame sections 5, 6, a certain distance in or out. The operating means form part of a tensioning device whose design will be explained hereafter (see Figs 3-5). Since the tensioning devices of the two lower frame sections 5, 6 are 5 identical, only one will be described.

An elongated drag link 29 is connected to the end 27 of the frame section 5 located inside the arm 7 by means of a rivet 28 passing through said tube end 27. The drag link 29 is constructed of flat bar with a hole 30 for the rivet 28 and extends from the tube end 27 into the tube section 23 of the arm 7. The drag link 10 is provided with a longitudinally oriented Polygrip type opening 32 passing through the thickness thereof, which opening is formed with a straight slip side 33 and, disposed parallel thereto, a gripping side 34 formed of a number of mutually adjoining and similar recesses each having the shape of a minor circular segment, i.e. the opening 32 is of the type found in so-called Polygrip 15 pliers. The opening 32 in the drag link 29 extends past two mutually parallel and opposite elongated shaft openings 35 in the wall of the tube section 23: A shaft 36 passes through the shaft openings 35 and the Polygrip opening 33. The shaft 36 projects a certain distance each side of the tube section 23, where it is connected at each side to the operating means 25, which has the form of a 20 handle which half encircles the tube section 23. The shaft 36 has the cross-section of a major circular segment such that the shaft has a plane surface 37 where the minor segment has been removed. The shaft is furthermore of a size such that its greatest diameter is substantially equal to the perpendicular 25 distance between the slip side 33 and the bottom of one of the circular segment shaped notches in the Polygrip side 34 and its least thickness at the plane surface 37 is substantially equal to the perpendicular distance between the slip side and the peaks separating the notches of the Polygrip side 34. The drag link is thus displaceable relative to the shaft when the shaft is positioned with its 30 plane surface parallel to the slip side, which is the case when the operating means projects substantially perpendicularly to the arm 7 as in Fig. 5, i.e. in its unfastened position, and is fixed relative to the shaft when the shaft 36 is positioned with its plane surface perpendicular to the slip side 33 and is in engagement with one of the circular segment shaped notches in the Polygrip 35 side 34, which is the case when the operating means is disposed along the tube section 23 as in Fig. 3. The connection between the shaft 36 and the operating means 25 arises from the circumstance that the shaft 36 is non-circular and its

attachment holes in the operating 25 are of matching non-circular form so that the shaft 36 is rigidly united with the operating means.

Disposed inside the tube section 23 and coaxially therewith is a retaining ring 38 through which the shaft 36 passes. A helical spring 39 extends inside the tube from the retaining ring 38 to the inner end of the drag link inside the arm 7. The helical spring is confined between the retaining ring 38 and hooks 40 fitted therefor on the inner end of the drag link 29 and thus tends on the one hand to force the drag link 29 inwards towards its bottom position inside the arm 7 and on the other hand to press the retaining ring outwards, thus causing the shaft 36 to bear upon that end of the shaft openings 35 located nearer the mouth of the tube section 23.

When the load carrier is to be mounted on a vehicle the procedure is as follows. The hooks 18, 19 of the load carrier are hitched over the top of the door 2 and the feet 10 are placed against the door or the window therein. The operating means 25, 26 on the two arms 7, 8 are positioned to project away from the tubes. The lower frame sections 5, 6 are then pulled out, against the force of the respective springs 39, so that the lower hooks 21, 22 can be hitched around the bottom edge of the door, whereupon the springs 39 cause the drag links 29 to draw the tube ends 27 a certain distance into the tubular arms so that the hitching means 21, 22 grip the bottom edge of the door 2 securely. Then in the final fastening operation, the operating means 25 are moved from their projecting, unfastened positions as shown in Fig. 5 to their fastened positions parallel to the arms as in Fig. 3. This brings about two things. In the first place, the shaft 36 rotates in the Polygrip opening 32 of the drag link so that its plane surface leaves the position in which the drag rod is free to move and engages with a nearby notch of the Polygrip opening. In the second place, a slip surface 41 of the operating means 25, disposed eccentrically in relation to the shaft 36, is caused to interact with a fulcrum 43 fixed by means of rivets 42 to the arm 7. The eccentric surface 41 and the fulcrum 43, which consists of a ring disposed around the tubular arm, are so dimensioned and located that with the operating means positioned with the shaft at the outer end of the shaft openings 35 and the operating means in unfastened position, the eccentric surface of the operating means is bearing on the fulcrum. As the operating means is turned towards its fastened position, the eccentricity of the surface bearing on the fulcrum increases, causing the shaft 36 to move in the shaft openings 35 towards that end of the shaft openings 35 located further from the mouth of the arm, in which movement it draws the drag link 29 with it. Thus when the

operating means has reached its fastened position, the whole load carrier is firmly tensioned across the door.

In order to retain the operating means in fastened position, the end thereof facing away from the shaft 36 may be formed with a nose 44 which extends around the tube to the side thereof facing away from the operating means and is secured with a snap fastening. Alternatively, the eccentric surface may be designed to have a slight decrease in its eccentricity towards the end of the motion so as to be self-locking.

While the invention is described and explained above with reference to an example of embodiment, the invention is to be regarded in a broader perspective, limited only by the following claims, within which numerous variants are possible. For example, it is technically possible to utilise, in place of the drag link mechanism, a drag rod with a ring united with the operating means, said ring and drag rod being provided either with interacting threads, such that the length of the lower frame sections is set by screwing the lower frame sections in or out; or with complementary multi-bayonet fittings which are disposed in a known manner to engage with each other in a first mutual angle of rotation and to be free-running in a second angle of rotation perpendicular to the first. It is also possible in an uncomplicated variant to dispense with the drag link and have the inner end 27 of the lower tube sections 5, 6 extend right up as far as the shaft 36, which in this case must be removable and selectively insertable in a consecutive series of holes along the inner end 27. It is clear that this variant will not afford the same quick and simple changeover as the examples described above and the gripping width is obviously inferior. In other uncomplicated designs the designer might content himself with a single hitching means at the top of the door, or even with just a single broad hitching means at the top and a broad hook at the bottom. It is also possible to interconnect the operating means so that they are operated in parallel by means of a crossbar or similar.

CLAIMS

1. A vehicle-mounted load carrier (1) of the type which is fastened across a door, hatch or similar (2), preferably at the rear of the vehicle (3), which load carrier comprises a load-bearing frame (4–6) and at least two gripping means (18, 19, 21, 22) disposed upon the frame and intended to grip two substantially mutually opposite edges, preferably the top and bottom edge of the door, and means (25) for tensioning the gripping means across the door by the positive mutual relative displacement thereof towards each other, characterised in that the frame is divided into a main section (4), bearing the gripping means (18, 19) for one edge, and at least one tensioning section (5, 6) disposed movably in relation to the main section and bearing the gripping means (21, 22) for the other edge, and that the main section (4) and the tensioning section (5, 6) are connected to each other in a linearly displaceable fashion, tensioning being achieved by the mutual displacement of the frame sections.
- 15 2. A vehicle-mounted load carrier as in Claim 1, characterised in that the main section (4) and the tensioning section (5, 6) are connected to each other by means of at least one pair of telescopically displaceable tubes (5, 7–8), tensioning being achieved by the telescopic movement of the tubes and 20 matching mutual displacement of the frame sections (4, 5–6).
- 25 3. A vehicle-mounted load carrier as in Claim 1 or 2, characterised in that the frame includes two tensioning sections (5, 6), each provided with gripping means (21, 22) for one edge, which tensioning sections are connected to the main section in a linearly displaceable fashion and disposed one at each side of the load-bearing frame.
- 30 4. A vehicle-mounted load carrier as in any of the preceding Claims, characterised in that each tensioning means includes an operating means (25) mounted rotatably about a shaft (36) and having an surface (41) which is eccentric in relation to said shaft (36), and a bearing surface on a fulcrum (43) interacting with the eccentric surface of the operating means, the shaft (36) and hence the operating means (25) being united to one of the frame sections (5, 6), and the fulcrum (43) being united to the other frame section so that the 35 operating means (25) and hence the load carrier (1) can be caused to assume an unfastened and a fastened position corresponding to the more or less

centred position of the fulcrum (43) in relation to the shaft (36) and to corresponding relative displacements of the frame sections (4, 5-6).

5. A vehicle-mounted load carrier as in Claim 4, characterised in that the shaft
5 (36) of the operating means is arranged to pass transversely through the outer
telescopic tube (7) via elongated holes (35) disposed along the length of the
tube, permitting movement of the shaft (36) along the tube, that a drag link (29)
is disposed inside the tube (7) between the shaft (36) and the inner telescopic
10 tube (27), and that the fulcrum (43) is disposed on the outer tube (7) and the
eccentric surface (41) disposed on the operating means (25) in such a manner
that the turning of the operating means from its unfastened to its fastened
position, by the interaction between the eccentric surface of the operating
means and the fulcrum, causes the shaft (36), the drag link (29), and hence the
inner tube (27) to slide telescopically into the outer tube (7).

15

6. A vehicle-mounted load carrier as in Claim 5, characterised in that the drag
link (29) has a connection to the shaft (36) which is adjustable longitudinally
along the drag link.

20 7. A vehicle-mounted load carrier as in Claim 6, characterised in that the drag
link (29) is elongated, that the shaft (36) passes through a hole (32) in the drag
link, that the hole in the drag link is elongated and disposed longitudinally along
the drag link and is formed with a slip side (33), which is straight, and a locking
25 side (34) having a row, parallel to the slip side, of mutually adjacent notches
having the shape of circular segments, and that the shaft (36) is of a cross-
section having the form of the major segment of a circle with a removed part
(37) in the form of a minor segment, the diameter of the circle being substantially
equal to the perpendicular distance between the slip side and the bottom of one
30 of the circular-segment shaped notches, and the smallest thickness of the shaft
at the "removed" segment being substantially equal to the perpendicular
distance between the slip side and the peaks separating the notches, and the
shaft (36) being rigidly united with the operating means (25) in such a manner
that when the operating means (25) is in its unfastened position the shaft has its
smallest thickness perpendicular to the slip side (33) and moveable in relation to
35 the hole (32) in the drag link, and when the operating means in its fastened
position part of the shaft is located in one of the circular segment shaped

notches, thus blocking transverse movement of the drag link (29) in relation to the shaft (36).

- 5 7. A vehicle-mounted load carrier as in any of the preceding claims, characterised in that the tensioning section (5, 6) is directly or indirectly pre-tensioned by spring-loading means (39) acting in the direction of insertion.

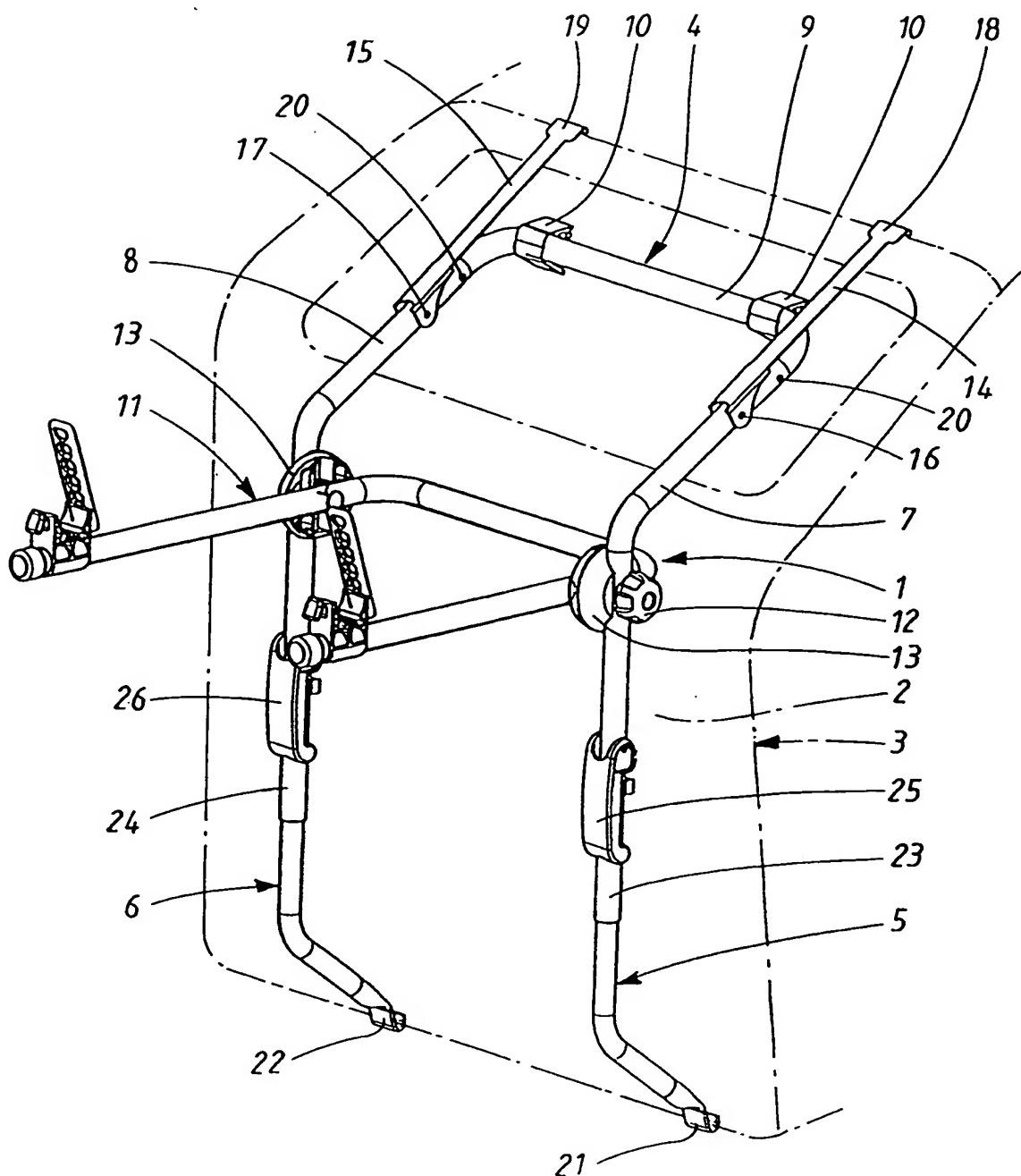
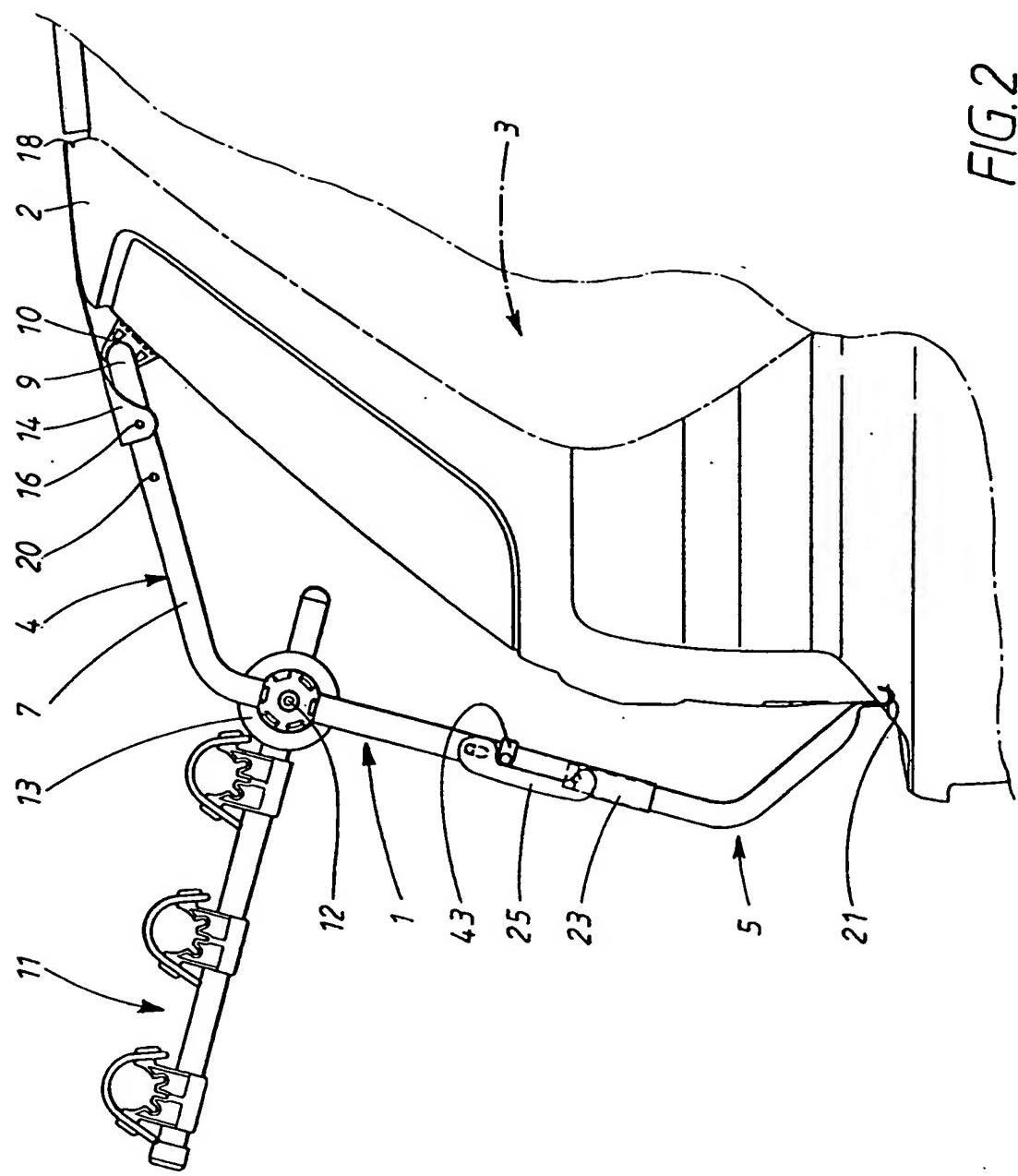


FIG. 1

FIG. 2

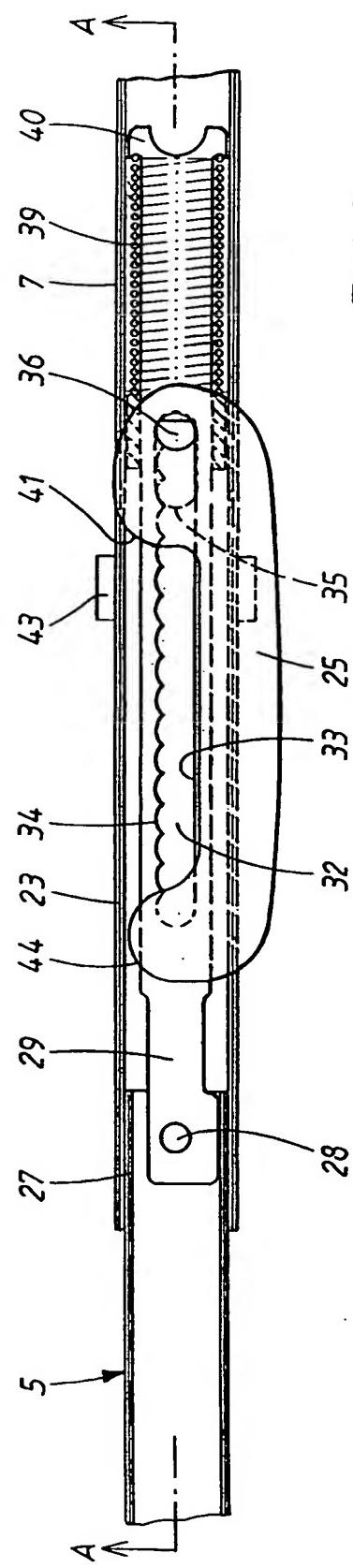


FIG. 3

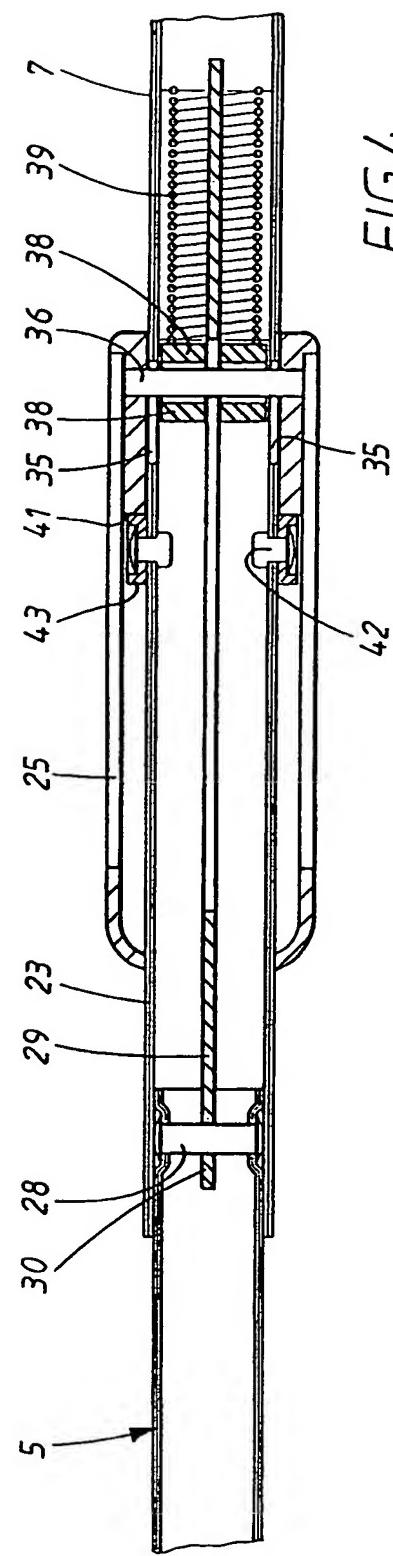


FIG. 4

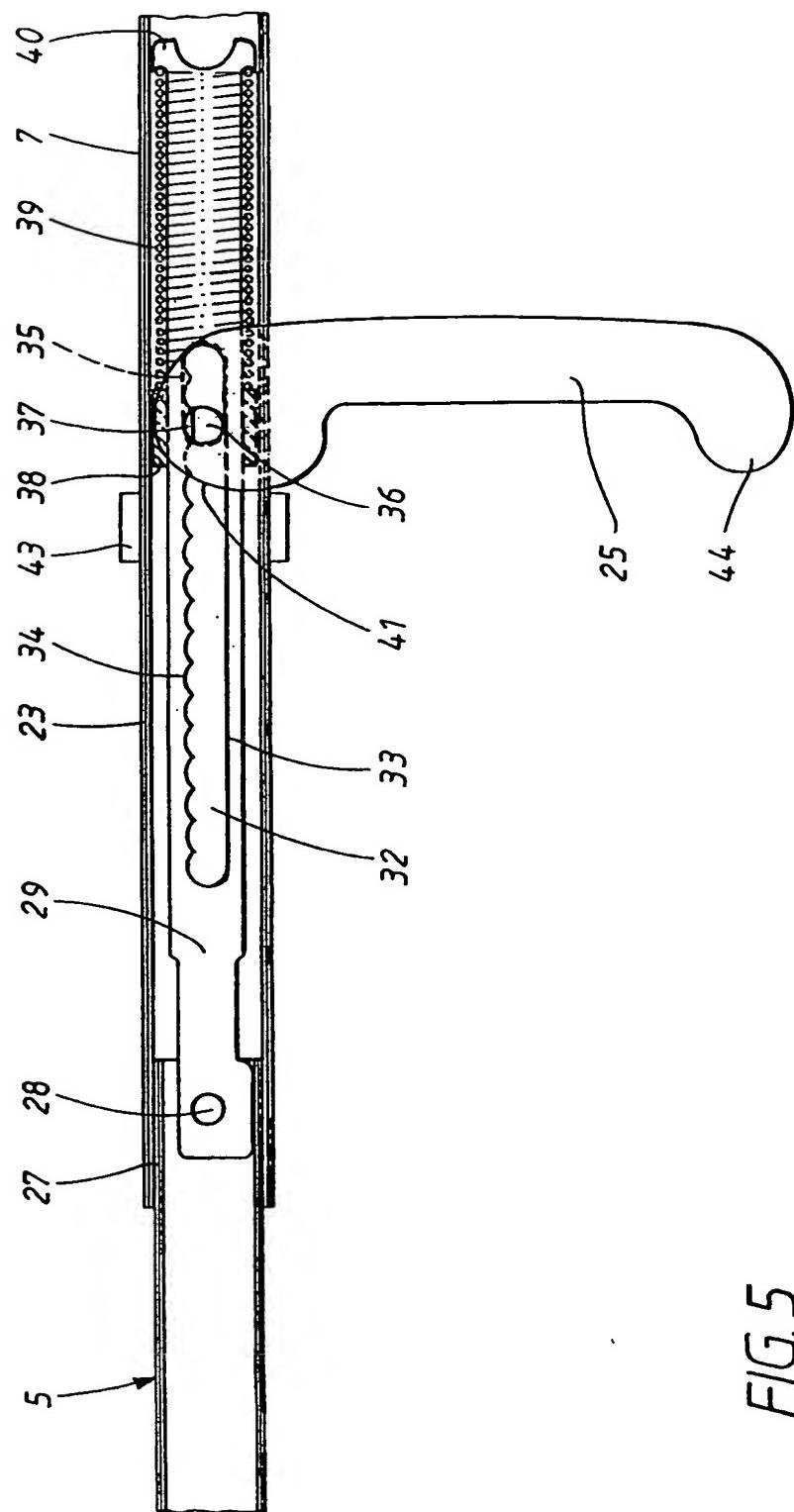


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01045

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60R 9/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 9730870 A1 (NORSK HYDRO ASA), 28 August 1997 (28.08.97) --	1-3

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search
28 August 2000

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01045**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

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